

- Fig. 1 b.* Surface, showing arched lips (folds) at the apertures of the autopores, enlarged about forty times.  
*Fig. 1 c.* Transverse section, showing one of the "maculæ," with the autopores ranged around it; enlarged about twenty times.  
*Fig. 1 d.* A portion of the same section, enlarged about forty times.  
*Fig. 1 e.* Longitudinal section, enlarged about twenty times.  
*Fig. 2.* *Fistulipora Torrubiæ*, De Vern. & Haime. Transverse section, enlarged about twenty times.  
*Fig. 2 a.* Portion of another section, to show folds in the autopores, enlarged about forty times.  
*Fig. 2 b.* Longitudinal section, enlarged about forty times.

## PLATE XVII.

- Fig. 1.* *Fistulipora utriculus*, Rom. Surface partially weathered, showing autopores and mesopores, enlarged about forty times.  
*Fig. 1 a.* Surface of the same, viewed in profile, showing prominence of the arched lips of the autopores. Similarly enlarged.  
*Fig. 2.* *Fistulipora Goldfussi*, Mich. Corallum of the natural size.  
*Fig. 2 a.* Transverse section, enlarged about twenty times.  
*Fig. 2 b.* Longitudinal section, enlarged to the same extent.  
*Fig. 3.* *Fistulipora dobunica*, Nich. & Foord. View of the corallum of the natural size.  
*Fig. 3 a.* Transverse section, enlarged about twenty times.  
*Fig. 3 b.* Longitudinal section, similarly enlarged.  
*Fig. 4.* *Fistulipora ericensis*, Rom. Transverse section, enlarged about twenty times.  
*Fig. 4 a.* Longitudinal section, similarly enlarged.

## PLATE XVIII.

- Fig. 1.* *Fistulipora trifoliata*, Schlüt. View of the corallum of the natural size.  
*Fig. 1 a.* Transverse section of one of the "maculæ," enlarged about twenty times.  
*Fig. 1 b.* Transverse section, enlarged about forty times.  
*Fig. 1 c.* Longitudinal section, enlarged about twenty times.  
*Fig. 2.* *Fistulipora cornuica*, Nich. & Foord. View of the corallum, growing on a Brachiopod shell. Nat. size.  
*Fig. 2 a.* Transverse section, enlarged about twenty times.  
*Fig. 2 b.* One of the autopores, enlarged about forty times.  
*Fig. 2 c.* Longitudinal section, enlarged about twenty times.

## BIBLIOGRAPHICAL NOTICE.

*Contributions to the Knowledge of the Older Mesozoic Flora of Virginia.* By WILLIAM MORRIS FONTAINE. *Monographs of the United States Geological Survey.* Vol. VI. Pp. 144, with 54 plates. Washington: 1883.

THE present volume contains a very full account of the older Mesozoic flora of Virginia. The author introduces the subject by a short geological sketch of the area from which the fossil plants were collected, in which is pointed out that the Mesozoic strata of Virginia are divisible into two well-marked groups, an older and a younger, both of which are characterized by plants of a totally different aspect. It is only those from the older Mesozoic group, however, with which the present monograph deals.

By far the greater portion of the specimens described in the work were derived from the area in the neighbourhood of Richmond which Mr. Fontaine distinguishes as the "Richmond Coal-field," as it is the most important district and contains nearly all the workable coal in the Mesozoic strata of Virginia. Considerable difficulty has been experienced in collecting specimens, as few openings have been made in the strata for many years; hence the specimens had in great measure to be collected from old and weathered refuse-heaps. Thus the work of securing good examples has been one of great labour.

As typical of the older Mesozoic areas of Virginia and as the most completely explored, the geology of the Richmond Coal-field is more fully described than that of any of the other areas. It contains several valuable coal-seams, but their number and thickness vary much in different parts of the field. There are, however, two important seams which appear to be persistent; of these the lower, called the main or big seam, is the most valuable, and though varying greatly in thickness and often dividing into two seams, attains at Clover Hill a varying thickness of from 15 to 26 feet.

The second part of the work comprises the description of the fossil plants, in which two new genera are created and many new species described. One of the new genera is named *Mertensides*, from the similarity of the individuals it embraces to the *Mertensia* group of the Gleicheniaceæ; but the ferns it includes differ in not showing the characteristic dichotomy of the *Mertensia*. The type of this genus is *Mertensides (Pecopteris) bullatus*, Bunbury, sp. The other new genus is *Pseudodanaopsis*, containing ferns with a Dictyopteroid nervation, but which also in some of their characters approach to Heer's *Danaopsis*. It contains two species, *Pseudodanaopsis reticulata* and *P. nervosa*.

Among the new species, *Lonchopteris virginiensis* is of special interest. The genus *Lonchopteris* was formerly regarded as Palæozoic, and only known to occur in the Coal-measures; but in *Lonchopteris virginiensis* there is one of the most handsome species of the genus, which is now shown to extend upwards to the Rhætic. In all forty-two species of plants are described from the older Mesozoic rocks of Virginia; of these, twenty-one are peculiar to the locality, four are either found in the Trias or allied to Triassic forms, eight are similar to plants found in the Jurassic or allied to plants occurring in rocks of that age, and twelve are either found in the Rhætic or allied to plants of that formation.

The third part of the work is devoted to the older Mesozoic flora of North Carolina, with the object of instituting a comparison between its fossil flora and that occurring in the Virginian Mesozoic area. Many of Emmons's species from North Carolina were, however, inaccurately determined; hence it was necessary for Mr. Fontaine to enter into a critical examination of Emmons's species, and as far as possible to correct his determinations. In the treatment of this difficult part of his subject Mr. Fontaine has acted most fairly, for he gives in Emmons's own words the descriptions of that writer's

species, accompanying them with a reproduction of the original figures; on these plants Mr. Fontaine makes many notes and corrections.

With the list of North-Carolina plants thus corrected a comparison is made with those from Virginia, which shows that both areas are of the same age.

A further comparison of the fossil plants from North Carolina and Virginia is instituted with those from Indian and European Mesozoic rocks, when the author arrives at the conclusion that the Mesozoic floras of North Carolina and Virginia are most probably Rhætic in age, certainly not older; he is also inclined to regard the Rhætic as forming transition beds, having more affinity with the Lower Lias than with Triassic strata.

The whole work evinces very careful investigation; the descriptions are full and the value of the monograph is greatly enhanced by the numerous figures which accompany the descriptions. The book cannot fail to prove of the greatest value to those interested in fossil botany. The author has contributed a valuable addition to the ever-increasing monographs of the United-States Geological Survey.

#### MISCELLANEOUS.

*Instinct of Orientation in Helix aspersa.* By F. D'A. FURTADO.

IN a house which I inhabited at St. Michael's, one of the Azores, there was a veranda with a flight of steps leading to a little court or garden. Above this was a second veranda supported by a stone column, which rested on the wall of the lower veranda. At the foot of the column had been set a flower-pot with a young banana bearing two or three leaves.

One morning I noticed a snail (*Helix aspersa*) lodged between the pot and the column, as if waiting for night to attack the plant. A leaf had already been gnawed, and to stop further depredations I threw the snail into the court. It was not much the worse for the fall, as it chanced to light upon a small manure-heap.

Next morning I was surprised to find the snail in precisely the same position as before between the pot and the column. I knew it by its size and colour, as well as by a curious covering of spiders' webs which it bore. It was evident that the snail possessed a remarkable sense of direction, which enabled it, after a violent shock, to make its way back over a distance of at least 6 metres in a very short time. In order to get to the bottom of the matter I threw the snail back to the heap and watched the result, which was as follows:—

June 10, 1884.—At about 9 A.M. the snail was resting, completely retracted within its shell, on the rail of the staircase, having travelled nearly 4 metres. In the evening it resumed its march, but so slowly that by 10 o'clock it had only reached the top of the rail, where it stopped again, having traversed a metre in two hours.